differed from that of Mr. Barlow, for instead of applying a magnet in the horizontal plane of the needle he placed two in the line of the dip, having their poles in the reverse position to those of the needle. In describing the results of his experiment, Mr. Christie calls the south pole of a magnet that which points to the north pole of the earth, so that the north end is the south pole, and the south end the north pole of his magnetic needles. In stating the deviations from any point considered as zero, those which he places in the direction of the sun's apparent daily motion are considered minus, and those in a contrary direction plus, whatever may be the position of the needle. The results of Mr. Christie's observations are given in the form of tables, the first of which extend from March 26 to March 31, and exhibit manifest deviation towards the east before eight in the morning, and the greatest westerly deviation about one P.M. In a second series of observations, with another needle, the directive force of which was to the power as 1·63 to 1, the times of the greatest easterly and westerly deviation agreed with the former, but the easterly was greater compared with the westerly. In a third series the suspension of the needle was improved, and the magnets were so adjusted as to render its directive force as 0·68 to 1. With this needle the observations were made nearly every hour, from the 5th to the 12th of April, and the mean results give the greatest easterly variation at $7^h\ 45^m$, the time of no deviation at $9^h\ 26^m$; the greatest westerly deviation took place at $1^h\ 24^m$, the time of zero being $6^h\ 40^m$, and the total daily variation amounting to $3°\ 41'$. After adverting to the influence of the weather, to irregularities referrible to the electric state of clouds, and to other causes of anomalies in prosecuting his inquiries, the author proceeds to determine the results of a numerous series of observations made as the former, but in which the position of the needle was somewhat altered, as well as that of the bar magnets; and to examine into the daily changes which take place at the points at which a needle is retained in equilibrio by two bar magnets, which he is led to believe arise from an actual change of intensity in the terrestrial forces, as well as from a change in their directions.

The author concludes his paper with remarks upon the influence of temperature in diminishing the power of the magnets, and infers that solar heat exceeds any other in producing such an effect; but that changes of temperature are not the only cause of the variations which take place in the points of equilibrium, is shown by their occurring independent of the temperature of the magnets.

On Fossil Shells. *By* Lewis Weston Dillwyn, *Esq. F.R.S. In a Letter addressed to Sir* Humphry Davy, *Bart. P.R.S.* Read June 5, 1823. [*Phil. Trans.* 1823, *p.* 393.]

In describing the shell fish supposed to yield the Tyrian dye, Pliny has adverted to its power of boring the shells of other fish; and Lamarck says that all mollusca, whose shells have a notch at the base of their

apertures, are possessed of similar powers. In the other genera of turbinated univalves, the aperture, instead of being notched, is entire, and they have all been proved to be herbivorous. Every turbinated univalve which Mr. Dillwyn has examined of the older beds, from the transition limestone to the lias, belongs to these herbivorous genera, and the family still inhabits our land and waters. On the contrary, all the carnivorous genera abound in the strata above the chalk, but are very rare in the secondary strata. In recent shells small holes bored by the predaceous Trachelipoda are common; and Mr. Dillwyn has observed similar holes in fossils from the London clay, but never in those of the older formations; and he thinks that the whole family of carnivorous Trachelipoda are very rare in all those strata where the Ammonites and other Nautilidæ abound. Ammonites, and the other principal multilocular genera, appear to have become extinct in northern latitudes when the chalk formation was completed: but a few of the Nautilidæ still inhabit the Southern Ocean. Mr. Dillwyn further observes, that all the marine genera of the herbivorous Trachelipoda, to which the fossil species belong, have an operculum, and that the carnivorous species of the secondary strata agree with them in this particular, though the unoperculated genera abound in the London clay. Although fossil Nautilidæ are common in the secondary strata of the United States, they are said not to have been found in South America. Hence, says the author, it may be queried whether the Cephalopoda were not confined to the more northern latitudes when the chalk formation was completed; and whether a decrease in the earth's temperature at that period may not have occasioned the entire destruction of some genera, and the migration of others to the south.

On the apparent Magnetism of Metallic Titanium. *By* William Hyde Wollaston, *M.D. V.P.R.S.* Read June 19, 1823. [*Phil. Trans.* 1823, *p.* 400.]

Adverting to his statement respecting the action of the magnet upon metallic titanium, published in the first part of the Philosophical Transactions for this year, which refers it to adhering iron, Dr. Wollaston observes, that in subsequent examinations he has found the crystals of that metal slightly attractable, although he had formerly considered them as not thus influenced when apparently perfectly pure. From some comparative trials, however, he finds that the magnetic power thus exhibited would be conferred by the presence of about $\frac{1}{250}$th part of iron alloyed with the titanium; and there is every reason to suspect that the latter metal might be thus contaminated. This is rendered additionally probable by the action of tests upon the solutions of the supposed pure titanium; and upon the whole, Dr. Wollaston thinks that we should not be warranted in classing titanium with the magnetic metals.